

machine. For example in a conventional process, the injection pressure will be set and then the molten material is injected into the mold cavity for a fixed time or a fixed stroke distance of the extrusion screw.

Such methods have yielded voice coil assemblies that have a standard deviation resonance spectrum that is about 300 Hertz. With the method of the present invention it has been found that a standard deviation, for a component such as a voice coil motor, that is preferably less than about thirty Hertz may be obtained.

Another advantage of the present invention is that a resonance spectrum of a component may be altered to avoid sympathetic system wide resonances of components in a hard disc drive. It is also interesting to note that the average resonance for the data in Table I gets progressively higher with higher end-of-fill pressures. To modify a resonance spectrum of a component a suitable phase change material is selected and the component is overmolded with a layer of phase change material in accordance with the method of the present invention. The proper injection pressure and fill rate necessary to obtain the desired resonance spectrum are then determined. The resonance spectrum is then evaluated. If points of sympathetic excitation are noted, the density of the encapsulated part is altered via changing cavity pressure to a new value. Once an acceptable structure is defined, the process settings are determined. The ability to control the pressure and fill rate, and monitor other parameters of the injection molding process in accordance with the method of the present invention, provide an ability to reproduce the desired resonance spectrum with every molding cycle.

With a predictable system wide resonance, hard disc drive manufacturers can utilize predictable system wide resonance hard disc drive components to better design more compact hard disc drives that produce less noise or vibration. Furthermore, the actuator position can be adjusted to follow the various positions of the media data tracks induced by vibrations by using a servo control. By reducing the variability of the frequency of these vibrations, manufacturers are able to control the actuator with more accuracy, thus leading to the ability to place more data tracks closer together. This offers the benefit of more storage per media disc.

It is contemplated that numerous modifications may be made to the components and methods of the present invention without departing from the spirit and scope of the invention as defined in the claims. For example, the method of the present invention can be used for other motors and components besides hard disc drive components. Motors used in the automotive industry such as windshield wiper motors, integral starter/alternators, drive motors for hybrid electric vehicles, appliance motors for clothes washers and dish washer and components of such motors can be encapsulated with a phase change material to reduce vibrational noise and obtain more reproducible resonance spectrums. Accordingly, while the present invention has been described herein in relation to several embodiments, the foregoing disclosure is not intended or to be construed to limit the present invention or otherwise to exclude any such other embodiments, arrangements, variations, or modifications and equivalent arrangements. Rather,

the present invention is limited only by the claims appended hereto and the equivalents thereof.